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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/694,649

10/27/2003

Robert A. Blake

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02/08/2005

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EXAMINER

HANLEY, JOHN C

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/694,649

Applicant(s)

BLAKE ET AL.

Examiner

John C Hanley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/27/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/19/04</u> . | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification is silent with respect to the conversion of amplitude attenuation to density. It is unclear if they are equivalent, or different data. If they are different, applicant has not shown how to determine density differences from the amplitude. For example, in claim 3, amplitude attenuation is recorded. In claim 4, the amplitude attenuation is analyzed to determine "indicated density differences", where indicated density differences are also stored. The specification does not define the difference. Claims 10/11 and 17/18 are similar.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-7, 11-14, and 18-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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5. It is unclear what is meant by "indicated" density differences as opposed to a mere density difference. It is also unclear what density differences are, in the context of the application. The map appears to indicate the actual density for each point of the map. Therefore, what "differences" are recorded for mapping? Absent a specific definition of indicated density differences in the specification, or a teaching of the difference between the transmission attenuation and density values, the Examiner is interpreting density differences as the transmitted power received at different locations.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Totzke (Reference U).

3. Totzke (Figure 9) teaches to detect the transmission of ultrasound through a grinding wheel in the form of a chemical mechanical polishing pad to detect the quality of the pad. A test stand rotatably supports the wheel. An ultrasonic transmitter and receiver are positioned proximate to opposite sides of the wheel so that sound waves pass through the wheel to the receiver. A computer is operatively coupled to the transmitting and receiving apparatus and is configured to record the amplitude of the received waves attenuated by the wheel. The computer maps the values of the attenuated waves received in a two-dimensional image (Figure 15) of different colors to

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represent different attenuation levels. The mapped attenuated waves inherently represent density differences in the wheel. It is further inherent that data be stored in computer memory, either main RAM or graphics memory, to save the scanned data collected incrementally over time to display it at the same time. It is noted that the receiver probe is not contacting the wheel, so that air is the coupling medium. The intended use recited in the preamble of claims 17-20 is not structurally limiting. The apparatus of Totzke is identical to the structure recited in applicant's claims, and it is fully capable of performing the same test on the test piece of applicant's intended use.

Claim Rejections - 35 USC § 103

4. Claims 1-6 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Totzke.

5. Totzke, as previously described, shows a method for recording density profiles of a grinding wheel in the form of a chemical mechanical polishing pad. Although it lacks a specific teaching to use this method to inspect a grinding wheel used to prepare work rolls used in metal sheet production, it would have been clearly obvious to one of ordinary skill in the art at the time of applicant's invention that the method steps of Totzke are equally capable of mapping density variations on a different type of grinding wheel.

6. Claims 8-9, 15-16 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Totzke as applied to claims 1-6, 10-13, and 17-20, above, and further in view of Bhardwaj (Reference W).

7. Although Totzke shows the receiver probe spaced from the grinding wheel and coupled via ambient air, it does not show the transmitter coupled via ambient air. However, Bhardwaj teaches, "ultrasound is useful for determining

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significant materials characteristics such as density" (page 1, first paragraph of introduction). In section 9.2 on page 12, it is stated "Analogous to the conventional water immersion technique, in the non-contact mode ultrasonic transducers can be raster scanned to generate images corresponding to the internal and surface characteristics of the test materials." In section 6.3 on page 8, it is stated "Direct transmission is relatively the easiest technique to apply in non-contact ultrasound. Therefore, it has been quite extensively studied and developed." In section 7, it is stated, "By utilizing NC transducers under ambient air environment we have amply demonstrated that frequencies as high as 2MHz can be easily propagated through a variety of materials, including fibrous and particulate, plastics, ceramics, metals, and composites." The reference further describes the "development of phenomenally high air/gas transduction piezoelectric transducers in the 100kHz to 5MHz frequency range" (see abstract, etc.). On page 2, third paragraph, the motivation for switching to non-contact from conventional ultrasound is expressed: "Due to extremely high attenuation of ultrasound by air, its transmission in a test medium is done by physically contacting (coupling) the transducer to the test medium. Therefore, all conventional ultrasound is based upon the severe limitation of a physical contact between the transducer and the test medium by a liquid gel. If this contact could be eliminated... a number of industrial materials sensitive to liquid contact could be tested for the measurements of thickness, density, mechanical properties, defect detection, etc.... Similarly, materials in the early stages of formation...could also be tested under manufacturing conditions."

8. Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to use non-contact ultrasound in the

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100kHz to 2MHz frequency range as taught by Bhardwaj to determine the density of a grinding wheel, as a substitute for contact ultrasound taught by Totzke, to avoid the requirement of liquid contact with the test piece.

9. Claims 7, 14 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Totzke as applied to claims 4, 11 and 18, respectively, above, and further in view of Dubois et al (US-6606909). Totzke lacks a specific teaching of a comparison of the results of measurement with known profiles of operational quality in a computer. However, Dubois et al show an apparatus and test methodology whereby ultrasonic test scans are compared with a database of known reference results in a computer. Therefore, it would have been obvious to one skilled in the art at the time of applicant's invention to grade the test results of Totzke by comparing them with known references in a computer as taught in Dubois et al to determine the quality or a defect in the part tested as compared to a known sample.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Totzke et al (reference V) is very similar to Totzke (Reference U). Note, however, the last paragraph before the conclusion, which indicates the amplitude variations in the map is due to a change in density, and that it "is known that pad density strongly contributes to the CMP processing results." Further, at the bottom of column 2, it is stated that the "picture may be correlated with the pad life and performance in order to predict these variables. This could increase yield by reducing the number of rejected wafers as the pad ages prematurely or lengthen production time by indicating which pads have more desirable properties." Walach and Grove show computer analysis of ultrasound images.

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Bhardwaj (US-6311573) shows a non-contact transmitter/sensor structure. The remaining patents generally show transmission methods and apparatus for ultrasound transmission attenuation measurements, several of which are of the non-contact type.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C Hanley whose telephone number is 571-272-2195. The examiner can normally be reached on M-F 9AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCH

A handwritten signature in black ink, appearing to be the initials 'JCH' with a stylized flourish.